Firmware

USER MANUAL SUPPLEMENT

Software Release 1.4

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1 Revision History

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Preface: About This Manual

This manual is written for system administrators, system integrators, network administrators and others who use the WiDirect appliance and WiClients. The WiDirect models span a broad spectrum of possible applications. The product can be used to manage wire line and wireless networks. The smaller models are appropriate for small office applications and local WISP applications. Larger models can manage common carrier network environments. Each WiDirect unit contains the same software and most of the features are available for use in each model. The feature set within the WiDirect appliance and WiClient is broad and is expected to continue to grow over time. These features provide significant capabilities that create a network infrastructure, one that can be used in numerous creative ways depending on the environment.

If you are installing a WiDirect or WiClient for the first time, you should read this entire supplement, as well as the entire WiDirect user manual, to become familiar with the settings and tools. However, the steps to actually install and configure a new WiDirect begin with *Section 3: Installation, In the user manual located at www.allcity-wireless.com/support.*

WiClient Administration Interface

1 Logging In

In order to gain initial access to the WiClient's web based GUI, plug the flashed WiClient access point into power. After the WiClient is fully booted up ~ 1 minute, establish a wireless connection over WIFI to the SSID "WiDirect" for initial configuration. Once connected, the WiClient provides the other connecting device with an IP address in the 10.4.1.0/24 subnet via DHCP. (Be sure that the connecting computer is configured for DHCP to receive the IP address.)

Once the IP address has been established, open a web browser such as Firefox, and open the following URL:

http://10.4.1.1/portal/admin

This URL opens the WiDirect Admin login page as shown in Figure 1-1. To login, use the preconfigured username of ***admin*** and the password ***widirect***.

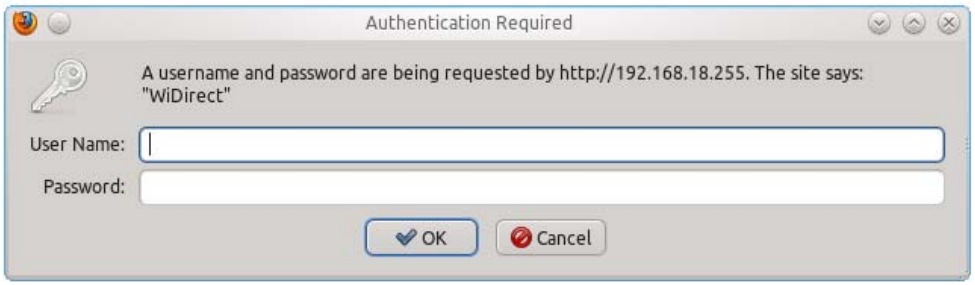


Figure 1-1: WiDirect Login

Note: If the default gateway of SSID1 has changed from the default, use the new Gateway address instead of 10.4.1.1.

2 System Status Menu

The system status menu is the first menu that is located in the left hand navigation bar of the WiDirect web GUI.

2.1 *Home*

The ***Home*** button, which is located in the top left hand corner of the administrator page, returns the user to the home screen. This is the same page that is displayed upon first logging into the WiClient. The home page gives a quick overview of the device role, if a license is present and if the WiClient is associated with a WiDirect Authorization Server. WiDirect Authentication Server association and Licensing is discussed in greater detail later in this manual supplement.

2.2 *System Check*

The ***System Check*** page under the ***System Status*** menu displays a snapshot of the current health of the WiClient system, as show in Figure 2-2. This page analyzes important system functions, such as **DHCP, Firewall, NTPD**, **and PreProxy** services by establishing if they are running.

Other information that can be found on this page is **Interface Settings, Routing table, NTP status**, and **Network statistics.** When contacting ACW technical support, the data on this page will be used to troubleshoot the health of the WiClient.

Changes to all the configurable services can be made by clicking the control link in the row across from the specific service you wish to make changes to.

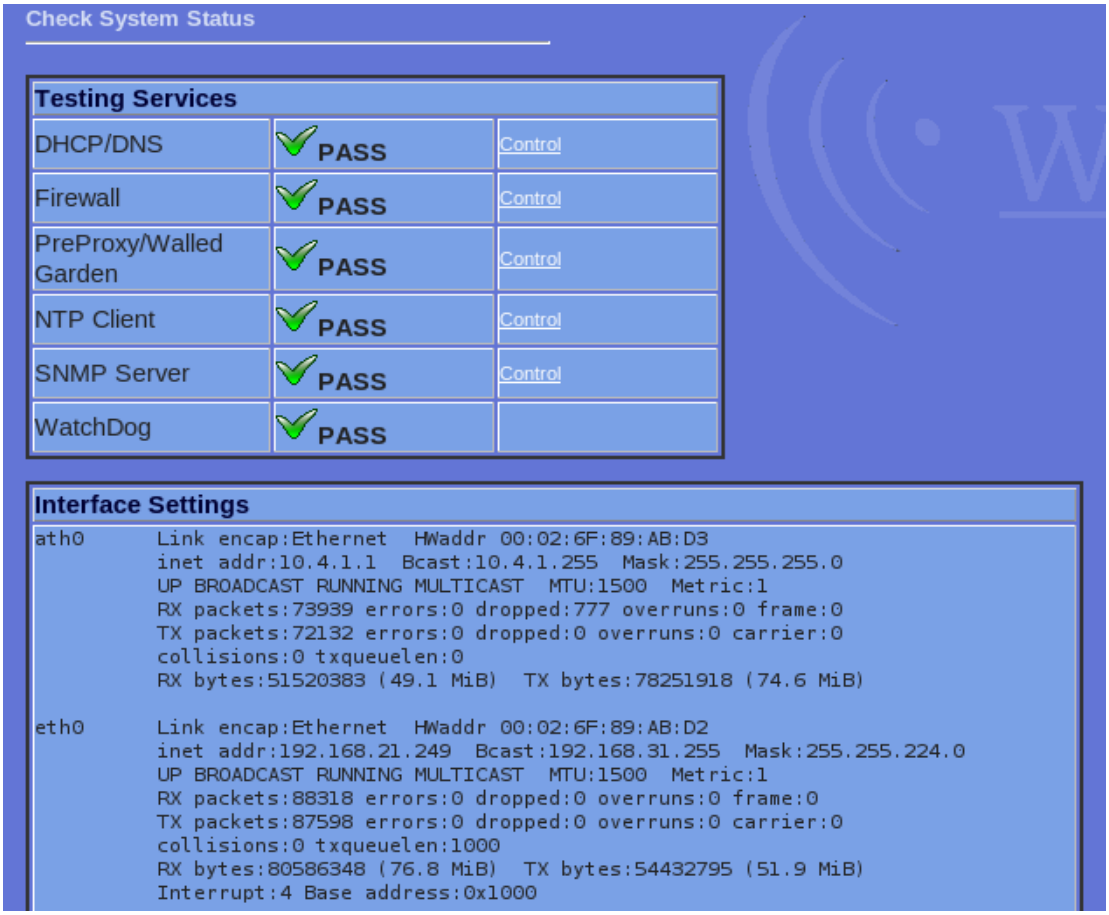
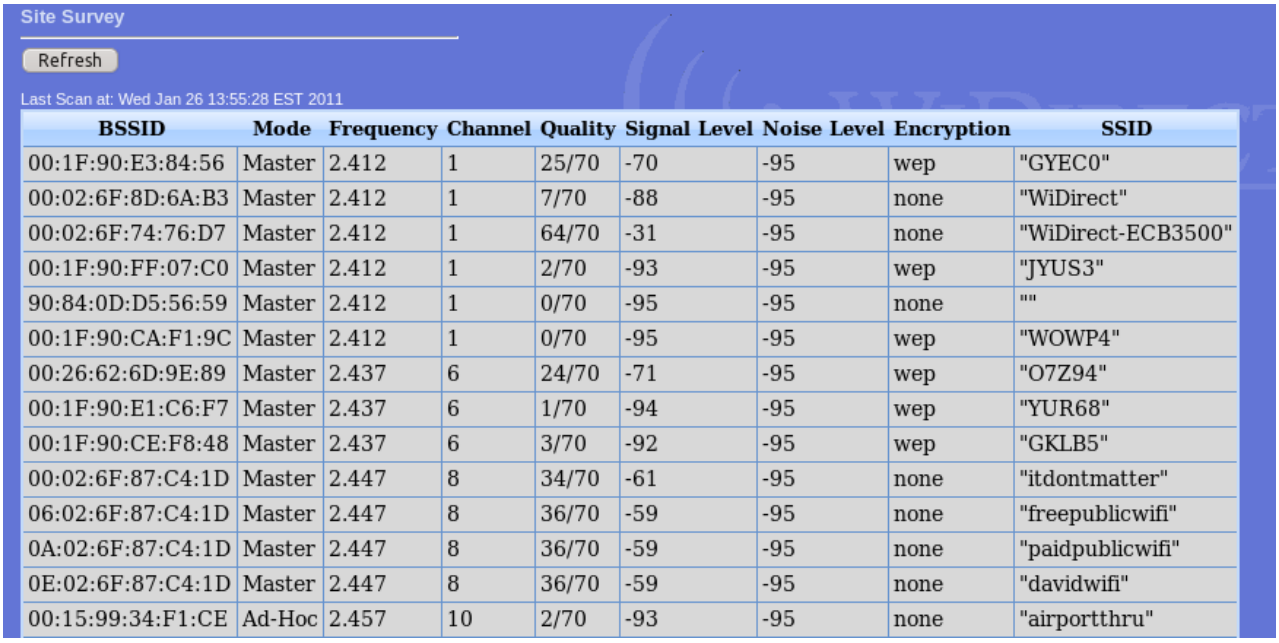


Figure 2-2: System Check

2.3 *Site Survey*

It is recommended to do a wireless survey prior to installing access points. Included in the WiClient firmware is a “site survey” utility to list all of the local networks and their corresponding channels. Be sure to run the site survey utility and refresh the screen 3 times to see all potential conflicting signals.



BSSID	Mode	Frequency	Channel	Quality	Signal Level	Noise Level	Encryption	SSID
00:1F:90:E3:84:56	Master	2.412	1	25/70	-70	-95	wep	"GYEC0"
00:02:6F:8D:6A:B3	Master	2.412	1	7/70	-88	-95	none	"WiDirect"
00:02:6F:74:76:D7	Master	2.412	1	64/70	-31	-95	none	"WiDirect-ECB3500"
00:1F:90:FF:07:C0	Master	2.412	1	2/70	-93	-95	wep	"JYUS3"
90:84:0D:D5:56:59	Master	2.412	1	0/70	-95	-95	none	""
00:1F:90:CA:F1:9C	Master	2.412	1	0/70	-95	-95	wep	"WOWP4"
00:26:62:6D:9E:89	Master	2.437	6	24/70	-71	-95	wep	"O7Z94"
00:1F:90:E1:C6:F7	Master	2.437	6	1/70	-94	-95	wep	"YUR68"
00:1F:90:CE:F8:48	Master	2.437	6	3/70	-92	-95	wep	"GKLB5"
00:02:6F:87:C4:1D	Master	2.447	8	34/70	-61	-95	none	"itdontmatter"
06:02:6F:87:C4:1D	Master	2.447	8	36/70	-59	-95	none	"freepublicwifi"
0A:02:6F:87:C4:1D	Master	2.447	8	36/70	-59	-95	none	"paidpublicwifi"
0E:02:6F:87:C4:1D	Master	2.447	8	36/70	-59	-95	none	"davidwifi"
00:15:99:34:F1:CE	Ad-Hoc	2.457	10	2/70	-93	-95	none	"airportthru"

Figure 2-3: Site Survey

2.4 *Status Graph*

The WiClient Firmware includes a live status graph for reporting CPU Utilization as well as Network Interface Utilization. This utility will be beneficial for troubleshooting network performance. Figure 2-4-1 shows the CPU utilization graph and Figure 2-4-2 illustrates interface ath0 graph.

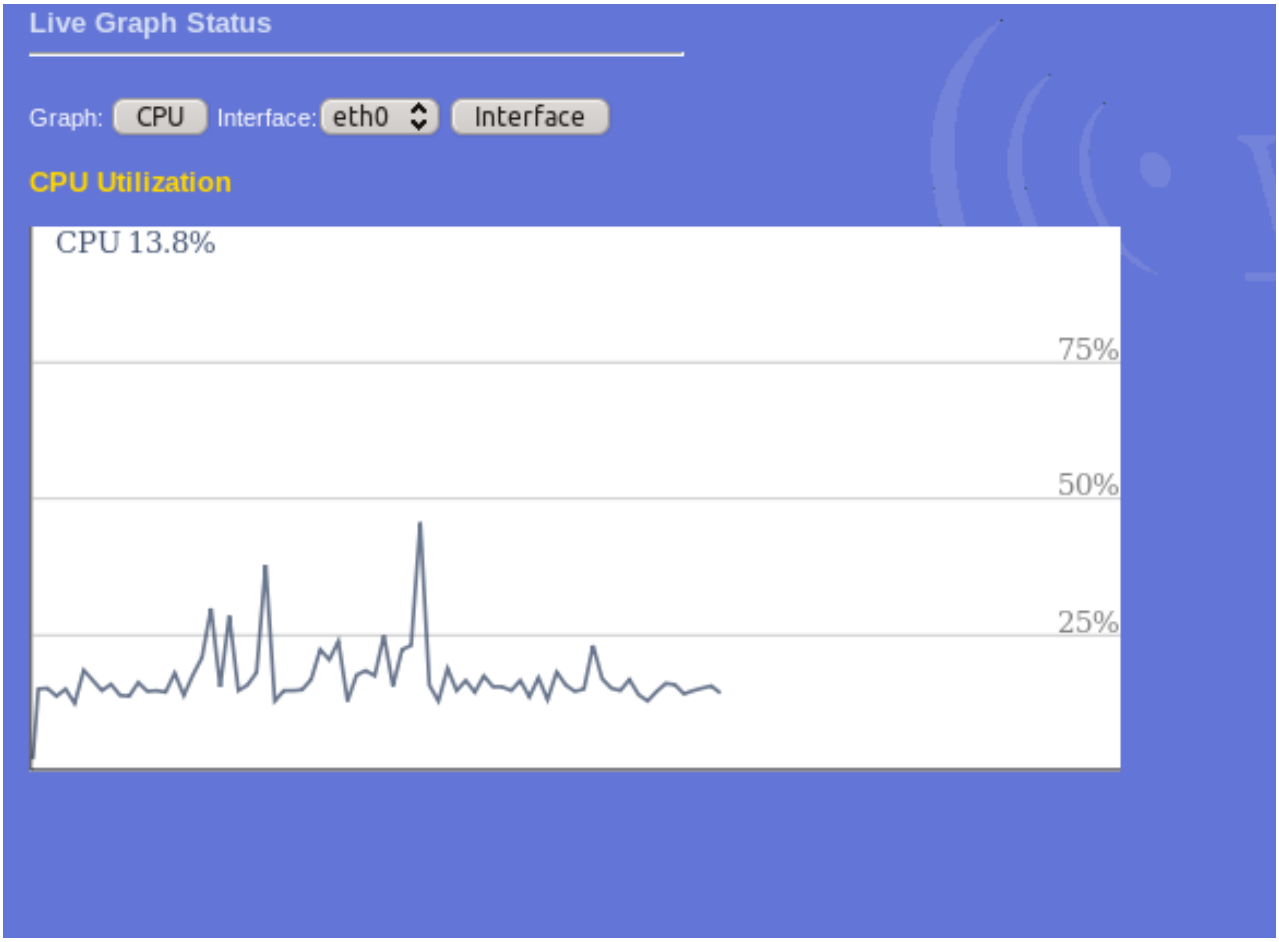


Figure 2-4-1: CPU Graph

Status Graph continued:

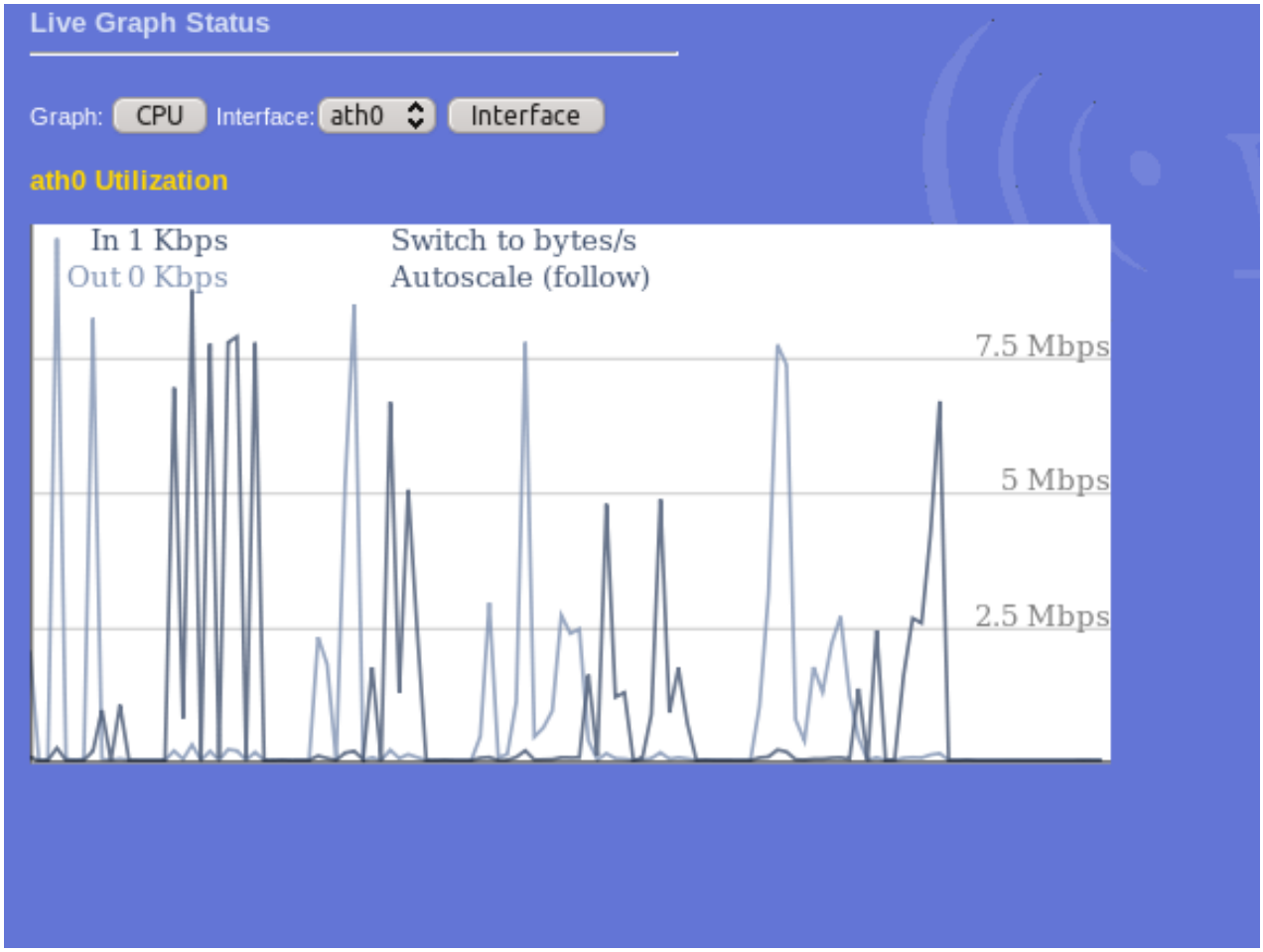


Figure 2-4-2: Interface ath0 Graph

3 System Configuration

3.1 *Network Configuration*

Accurate network configuration IP addressing is critical to the proper operation of the WiClient. All network configuration and routing configuration is controlled via the ***Network Configuration*** page under the *System Configuration* menu. Figure 3-1 shows the **Network Configuration** window.

This page allows configuration of the WiClient interfaces, the default route and the DNS servers. The first section allows the administrator to set which interface is to be used as the WAN interface. By default the WAN interface is ETH0. If DHCP is enabled the Default Route and DNS server fields will be disabled, because that information will be retrieved via DHCP.

By default the ETH0 interface is configured for DHCP, while the SSID1 interface uses the standard 10.4.1.1 /24 subnet addressing scheme.

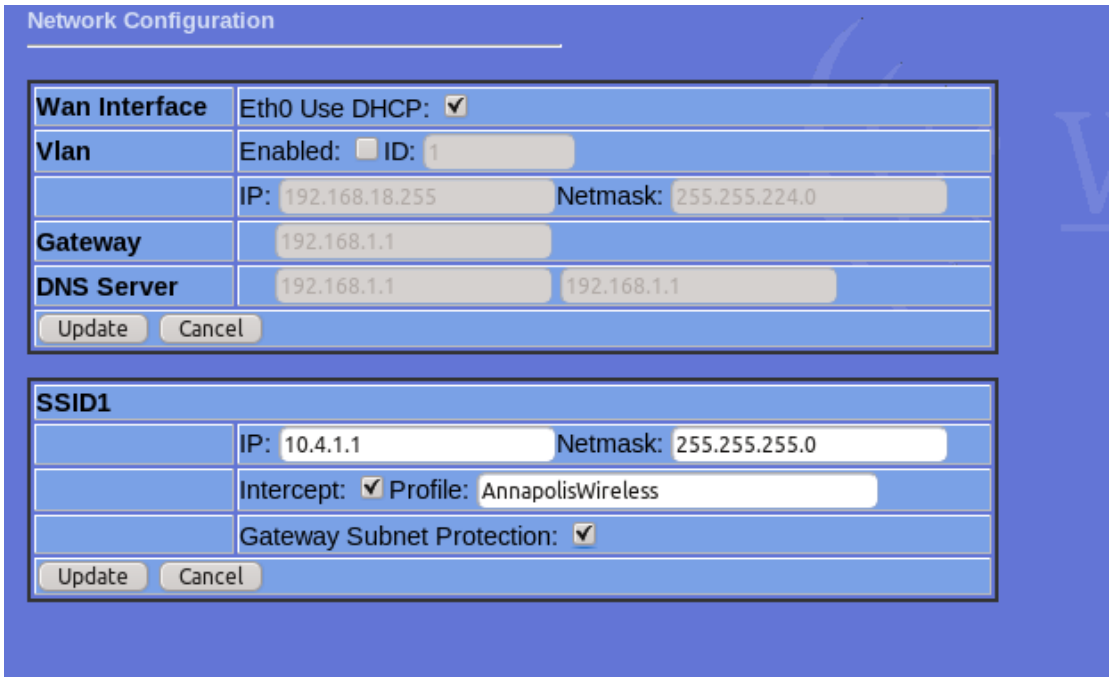


Figure 3-1: Network Configuration

3.2 *Gateway Subnet Protection*

To have the WiClient apply policies on a specific SSID, check the box ***"Intercept"*** and assign a valid profile to the network interface. This is to allow for other SSIDs to be broadcast without WiDirect intervention on the user experience.

You may also block all other ***"LAN Subnets"*** by selecting ***"Gateway Subnet Protection"***. This is enabled or disabled on a Per SSID Basis. Gateway Subnet Protection isolates all other internal routable subnets from traffic coming from a specific SSID and forces that traffic to the internet gateway only. Use this feature to protect systems sharing a common internet connection such as POS or other computers in the enterprise.

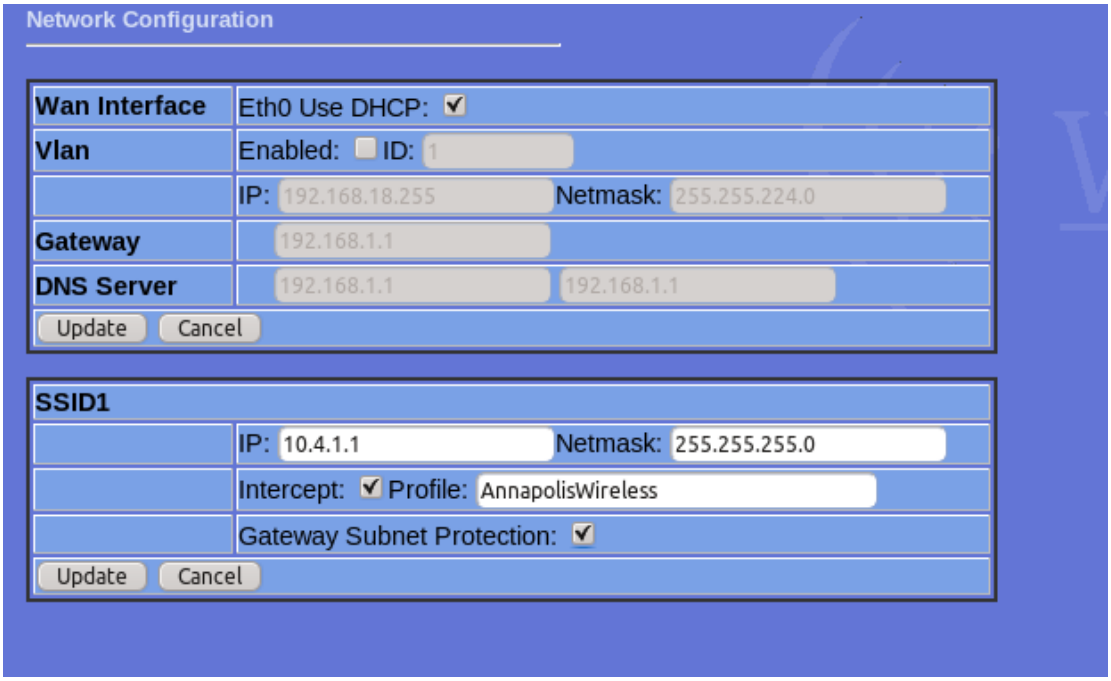


Figure 3-2: Subnet Protection

3.3 *Wireless Configuration*

The WiDirect allows for multiple SSID's and various encryption and connectivity settings. The following section describes all the possible items for the Wireless configuration.

Keyword	**Description**
Country	The country must be set to properly regulate the channel and transmit power regulatory limitations.
Antenna	If the device is equipped with multiple antennas per radio you may select to use diversity or assign the radio to use a single antenna.
Channel	Select the Channel that you wish the WiDirect to operate on. You may wish to do a site-survey prior to selecting a new channel.
Transmit Power	Select the Transmit Power that the radio should operate with.
SSID (Enabled)	Enable the use of the Selected SSID
SSID (Encryption Mode)	Select which Encryption method you would like to use. **(NONE, WEP, WPA-PSK, WPA2-PSK, WPA-PSK/WPA2-PSK Mixed)** **Wep Key Length:** (64bit / 5 Characters) (128bit / 13 Characters)
SSID (Encryption Key)	The encryption key is available when Encryption mode is not None.
SSID (Rate)	Select the DataRate that you would like the Radio to use. **(Recommended Auto)**

Once the configuration is changed you would select ***"Save Config and Apply"***. The wireless will reinitialize with the new configuration.

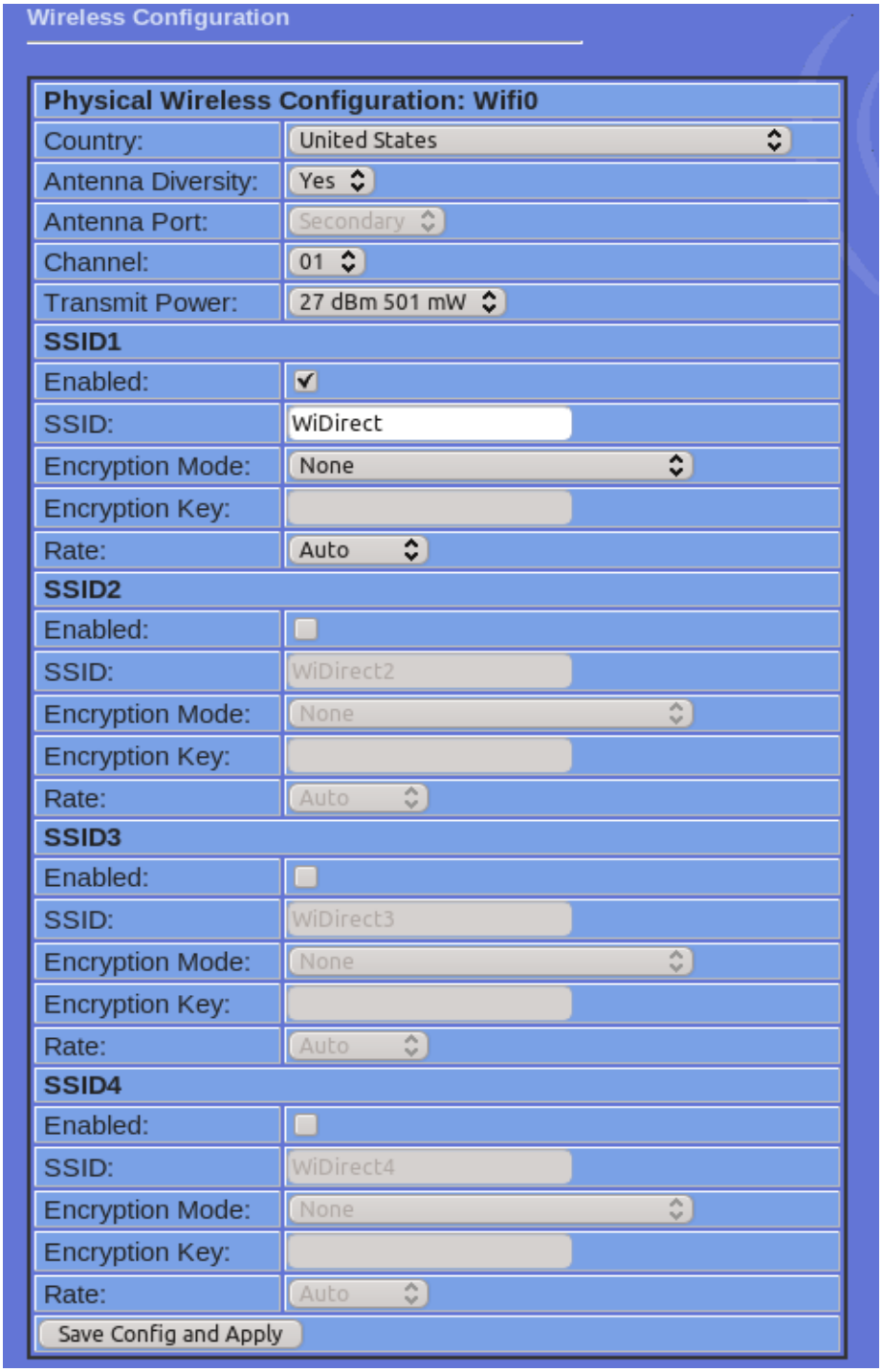


Figure 3-3: Wireless Configuration

3.4 *Meshing Configuration*

The WiClient Firmware includes wireless meshing functionality in the event you wish to install another device which does not currently have Ethernet connectivity. For the device with Ethernet connectivity you would assign the ***"Mesh Mode"*** as a Gateway and ***"Repeater"*** on the standalone unit. If the device is equipped with a second radio, you may assign the Meshing functionality to the Second Radio by ***"Mesh Radio"*** to separate the wireless operations, improving throughput.

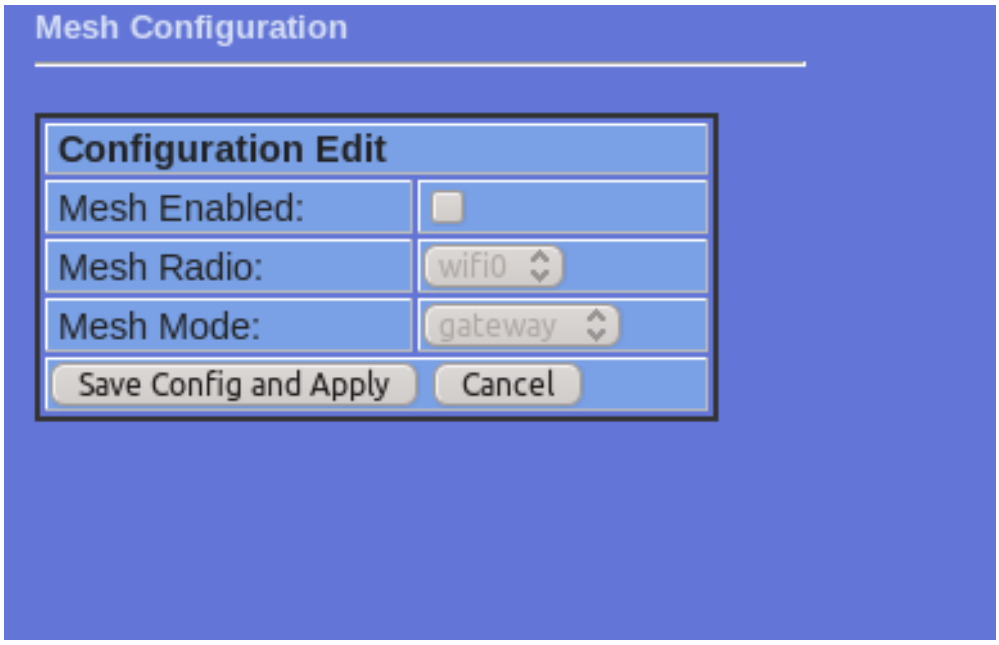


Figure 3-4: Meshing Configuration

3.5 *Time Zone*

Select *Time Zone* under the System Configuration menu. From the drop down menus, set the time zone. Don't forget to click the **Update** button next to the appropriate commands to implement your selections.

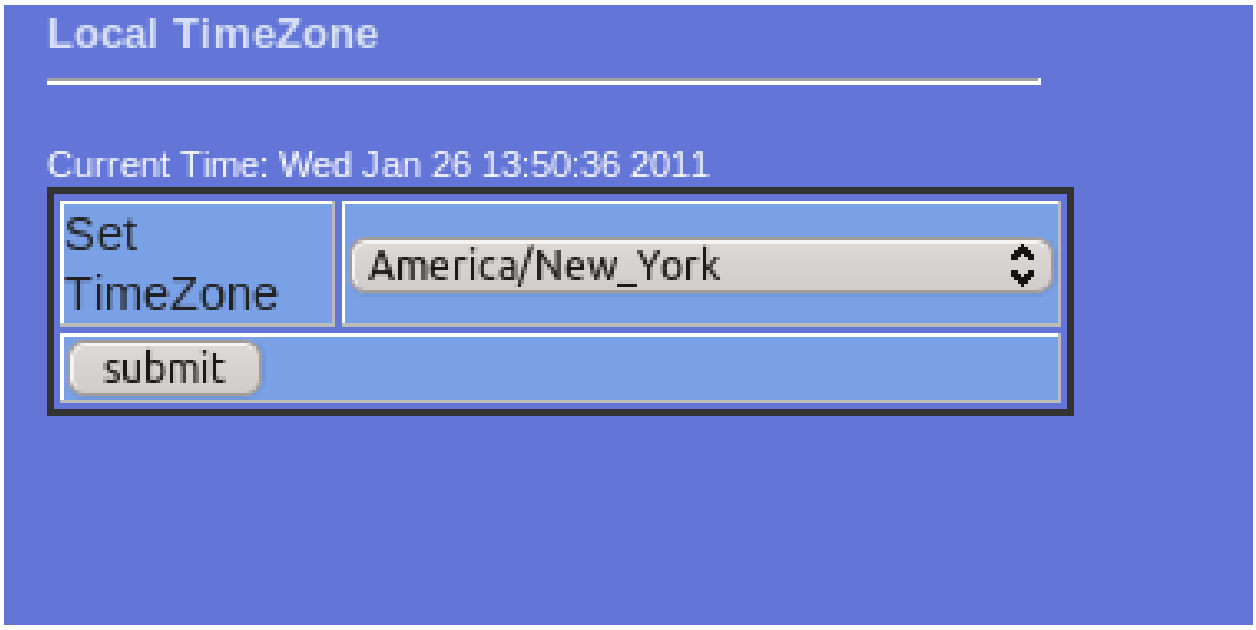


Figure 3-5: Date and Time

3.6 *Log Viewer*

With the ***Log Viewer*** page, located under the System Configuration menu, log files can be viewed in real-time. Choose the appropriate log file by clicking on the link and a separate screen opens to view the log. This page will update as new entries are being added to the log file.

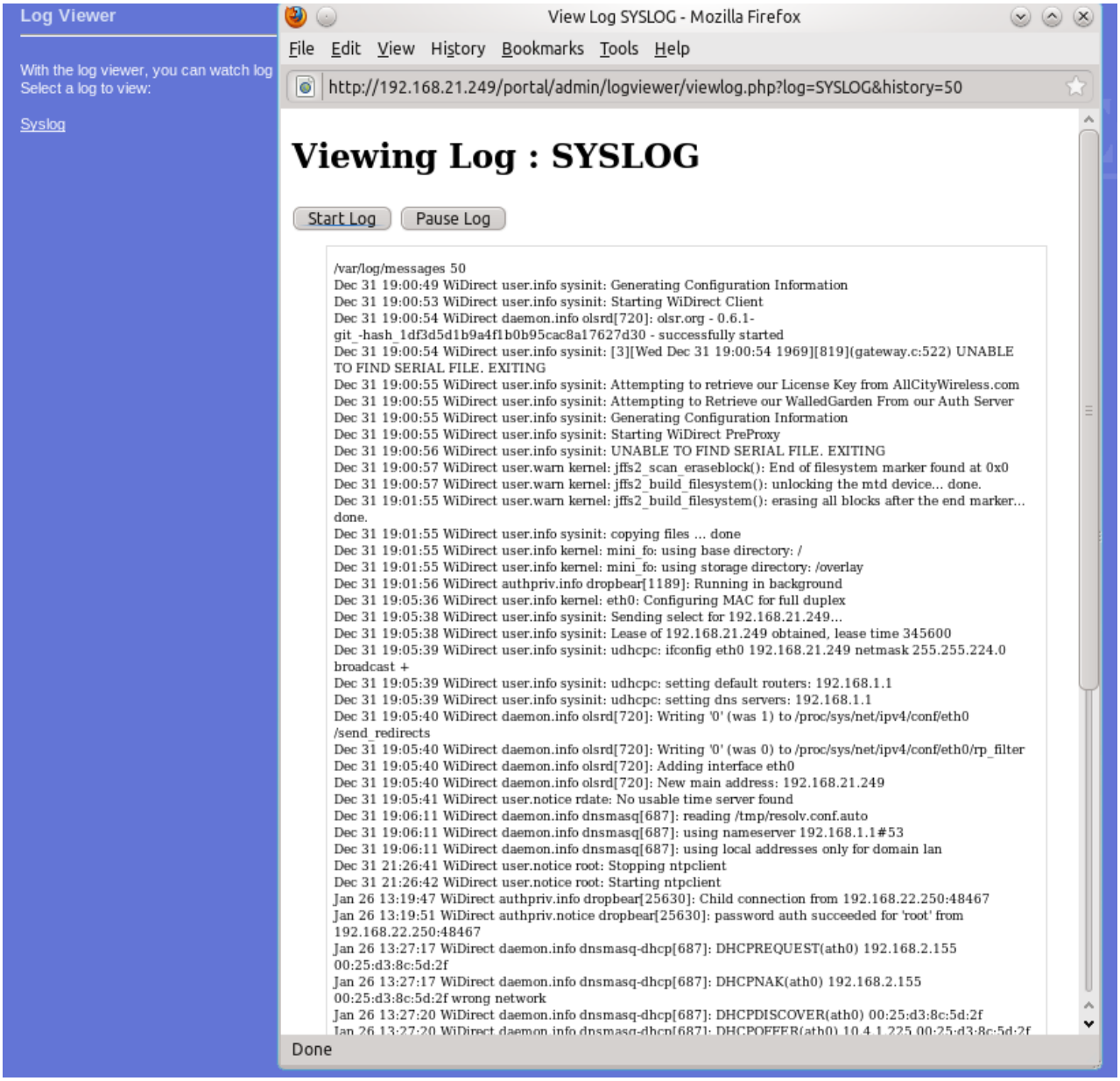

Log Viewer
With the log viewer, you can watch log
Select a log to view:
Syslog
View Log SYSLOG - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://192.168.21.249/portal/admin/logviewer/viewlog.php?log=SYSLOG&history=50
Viewing Log : SYSLOG
Start Log
Pause Log
/var/log/messages 50
Dec 31 19:00:49 WiDirect user.info sysinit: Generating Configuration Information
Dec 31 19:00:53 WiDirect user.info sysinit: Starting WiDirect Client
Dec 31 19:00:54 WiDirect daemon.info olsrd[720]: olsr.org - 0.6.1-
git_-hash_1df3d5d1b9a4f1b0b95cac8a17627d30 - successfully started
Dec 31 19:00:54 WiDirect user.info sysinit: [3][Wed Dec 31 19:00:54 1969][819](gateway.c:522) UNABLE
TO FIND SERIAL FILE. EXITING
Dec 31 19:00:55 WiDirect user.info sysinit: Attempting to retrieve our License Key from AllCityWireless.com
Dec 31 19:00:55 WiDirect user.info sysinit: Attempting to Retrieve our WalledGarden From our Auth Server
Dec 31 19:00:55 WiDirect user.info sysinit: Generating Configuration Information
Dec 31 19:00:55 WiDirect user.info sysinit: Starting WiDirect PreProxy
Dec 31 19:00:56 WiDirect user.info sysinit: UNABLE TO FIND SERIAL FILE. EXITING
Dec 31 19:00:57 WiDirect user.warn kernel: jffs2_scan_eraseblock(): End of filesystem marker found at 0x0
Dec 31 19:00:57 WiDirect user.warn kernel: jffs2_build_filesystem(): unlocking the mtd device... done.
Dec 31 19:01:55 WiDirect user.warn kernel: jffs2_build_filesystem(): erasing all blocks after the end marker...
done.
Dec 31 19:01:55 WiDirect user.info sysinit: copying files ... done
Dec 31 19:01:55 WiDirect user.info kernel: mini_fo: using base directory: /
Dec 31 19:01:55 WiDirect user.info kernel: mini_fo: using storage directory: /overlay
Dec 31 19:01:56 WiDirect authpriv.info dropbear[1189]: Running in background
Dec 31 19:05:36 WiDirect user.info kernel: eth0: Configuring MAC for full duplex
Dec 31 19:05:38 WiDirect user.info sysinit: Sending select for 192.168.21.249...
Dec 31 19:05:38 WiDirect user.info sysinit: Lease of 192.168.21.249 obtained, lease time 345600
Dec 31 19:05:39 WiDirect user.info sysinit: udhcpc: ifconfig eth0 192.168.21.249 netmask 255.255.224.0
broadcast +
Dec 31 19:05:39 WiDirect user.info sysinit: udhcpc: setting default routers: 192.168.1.1
Dec 31 19:05:39 WiDirect user.info sysinit: udhcpc: setting dns servers: 192.168.1.1
Dec 31 19:05:40 WiDirect daemon.info olsrd[720]: Writing '0' (was 1) to /proc/sys/net/ipv4/conf/eth0
/send_redirects
Dec 31 19:05:40 WiDirect daemon.info olsrd[720]: Writing '0' (was 0) to /proc/sys/net/ipv4/conf/eth0/rp_filter
Dec 31 19:05:40 WiDirect daemon.info olsrd[720]: Adding interface eth0
Dec 31 19:05:40 WiDirect daemon.info olsrd[720]: New main address: 192.168.21.249
Dec 31 19:05:41 WiDirect user.notice rdate: No usable time server found
Dec 31 19:06:11 WiDirect daemon.info dnsmasq[687]: reading /tmp/resolv.conf.auto
Dec 31 19:06:11 WiDirect daemon.info dnsmasq[687]: using nameserver 192.168.1.1#53
Dec 31 19:06:11 WiDirect daemon.info dnsmasq[687]: using local addresses only for domain lan
Dec 31 21:26:41 WiDirect user.notice root: Stopping ntpclient
Dec 31 21:26:42 WiDirect user.notice root: Starting ntpclient
Jan 26 13:19:47 WiDirect authpriv.info dropbear[25630]: Child connection from 192.168.22.250:48467
Jan 26 13:19:51 WiDirect authpriv.notice dropbear[25630]: password auth succeeded for 'root' from
192.168.22.250:48467
Jan 26 13:27:17 WiDirect daemon.info dnsmasq-dhcp[687]: DHCPREQUEST(ath0) 192.168.2.155
00:25:d3:8c:5d:2f
Jan 26 13:27:17 WiDirect daemon.info dnsmasq-dhcp[687]: DHCPNAK(ath0) 192.168.2.155
00:25:d3:8c:5d:2f wrong network
Jan 26 13:27:20 WiDirect daemon.info dnsmasq-dhcp[687]: DHCPDISCOVER(ath0) 00:25:d3:8c:5d:2f
Done

Figure 3-6: Log Viewer

3.7 *License Key*

If needed, new license keys can be added to the WiClient. To add new licenses, select ***License Key*** under the ***System Configuration*** menu. Browse to the directory where the license file is located on the local machine and then click **Upload**.

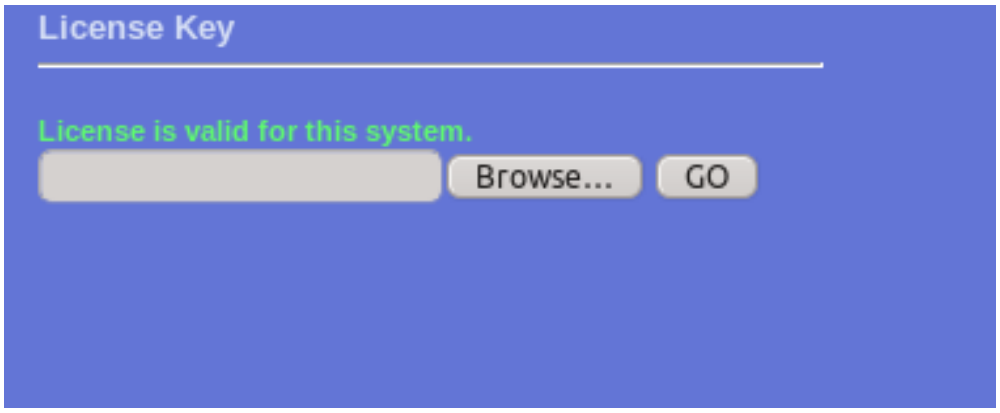


Figure 3-7: License Key

Depending on usage of the system and the license that was originally purchased, a new license may need to be purchased to support more features. Consult the AllCityWireless.com website to determine the type of license required.

3.8 *Restart*

The ***Restart*** page, listed under the ***System Configuration*** menu, allows the Administrator to reboot the WiClient unit.

3.9 *Administration*

The Administration page is used to change the ***"admin"*** password for administration from the web interface. You may also change the WiDirect Operational mode by selecting a new mode from the drop down interface. (Modes available are determined by the license on the WiDirect).

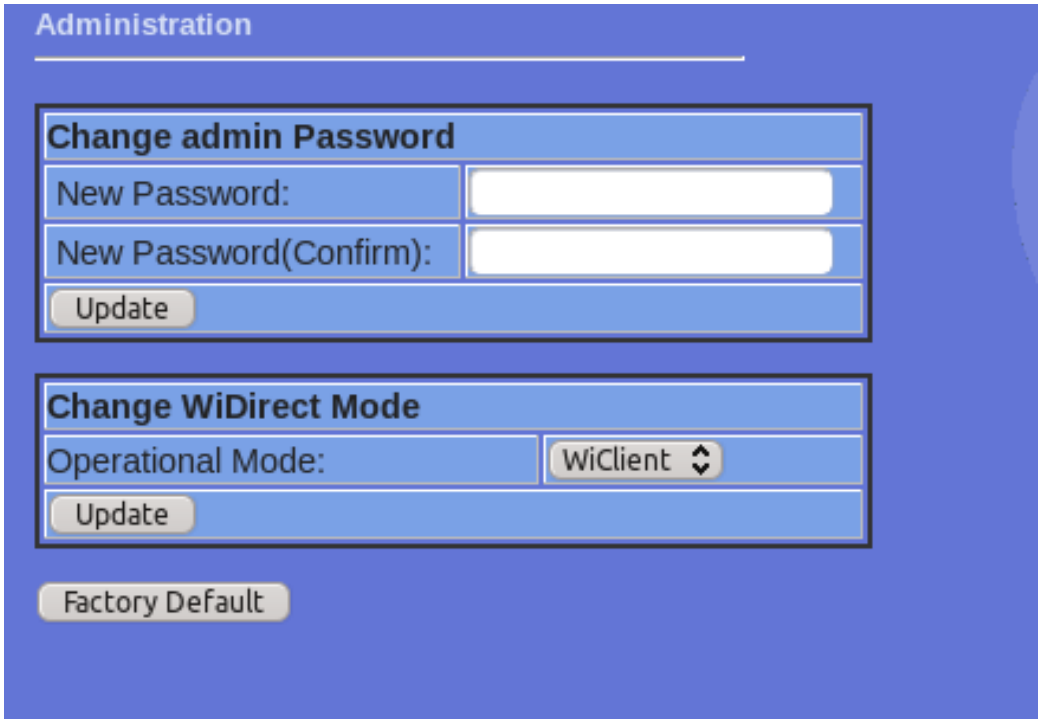


Figure 3-9: Administration Configuration

3.10 *Firmware Upgrade*

The WiClient Firmware allows for firmware upgrades through the Administration web interface. You may retrieve firmware updates from http://www.allcitywireless.com. After uploading the firmware to the device your device may become unresponsive for 2-5 minutes while applying the updates. You may also choose to clear the device's configuration by deselecting "Keep Configuration" prior to submitting the firmware.

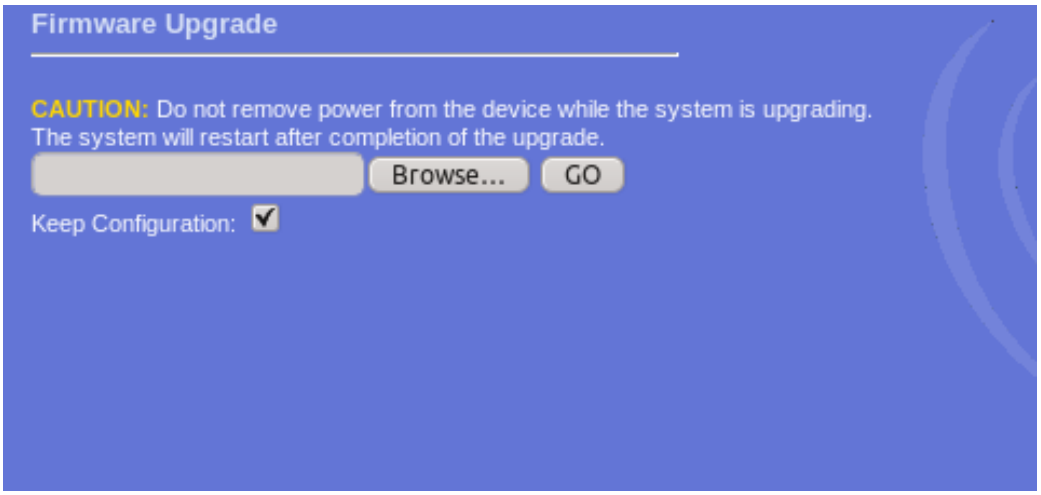

Firmware Upgrade
CAUTION: Do not remove power from the device while the system is upgrading.
The system will restart after completion of the upgrade.
Browse...
GO
Keep Configuration:

Figure 3-10: Firmware Upgrade

4 Services Menu

4.1 *DHCP*

The WiClient provides DHCP services to all available SSID interfaces.

Keyword	Description
SSID (Disabled)	Check this to prevent the DHCP Server from listening on the SSID Interface.
SSID (Start Address)	The first assignable IP In the Address Pool Range.
SSID (End Address)	The last assignable IP In the Address Pool Range.
SSID (Lease Time)	The length of the DHCP Lease. After which the associated client will send a new DHCP Request.

Once the configuration has changed, use the **Save Config and Apply** to save the changes. This button is shown in Figure 4-1.

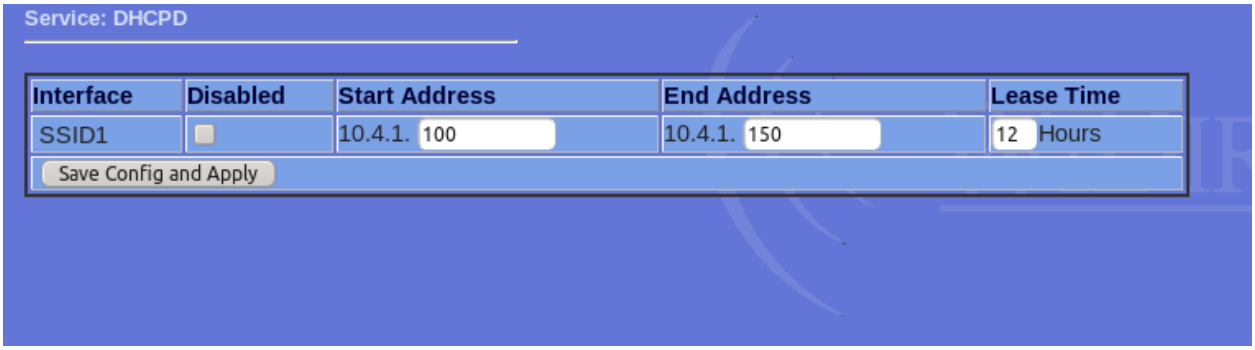


Figure 4-1: Service DHCP

4.2 *NTP Client*

The WiClient internal clock must remain accurate for a number of the critical systems to function. In order to make this work properly, an NTP server is polled to synchronize the internal clock with a known NTP clock. NTP also provides time services to local devices.

To edit the NTP configuration, go to the ***NTP Client*** page under the ***Services*** menu. This is the standard NTP configuration and it will allow you to change NTPD servers as needed. If more information is required for configuring NTP, please see the NTP web site: http:://www.ntp.org.

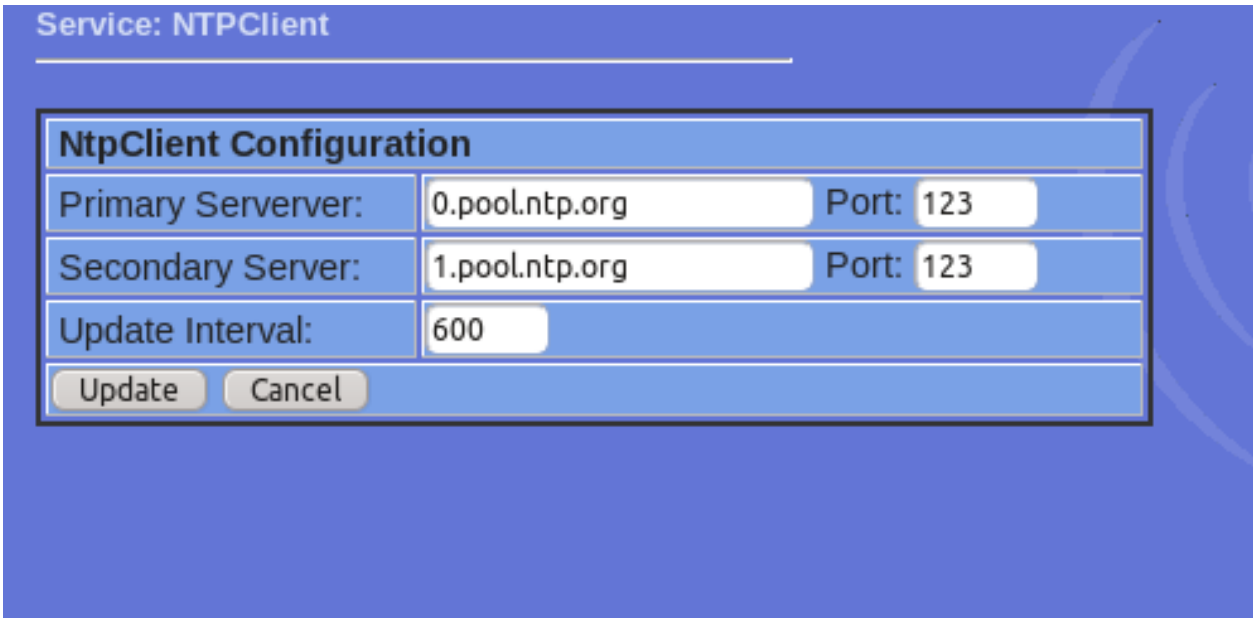


Figure 4-2: NTPD Configuration

4.3 *Firewall*

The WiClient's ***Firewall*** filters traffic that is passing between the LAN and WAN sides of the WiClient. Firewalls can be programmed to block traffic based on a wide variety of criteria. Traditionally, firewalls enforce policies to maintain network security by using a set of rules that determine whether or not traffic is allowed to pass between the LAN and the WAN on a per-packet basis.

The following section describes all the possible items for the Firewall configuration. The first section describes all the Non-filtering firewall configuration items and the second section describes the traffic filtering configuration times. Firewall filtering rules dictate which traffic is allowed inbound and outbound of the WiDirect.

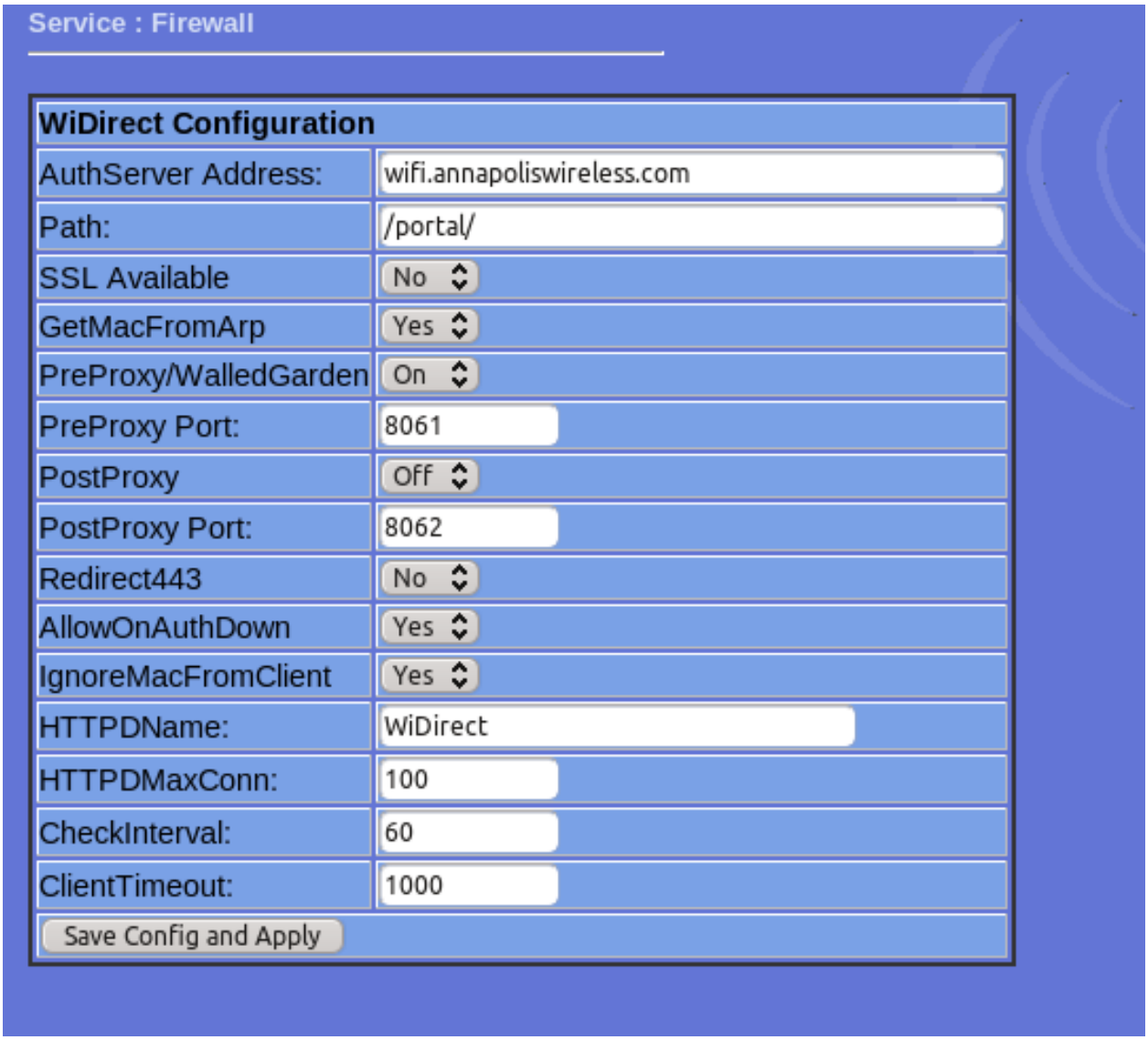


Figure 4-3: Firewall Configuration Page

4.3.1.1 Firewall Configuration Options

Table 4-3 lists the firewall configuration items.

Keyword	Description
AuthServer Address	The IP Address or URL of the WiDirect AuthServer
Path	Path to AuthServer Directory. Do not change unless advised by AllCityWireless.

SSL Available	Enable if you would like the users to be sent to the AuthServer Login with SSL.
GetMacFromArp	Retrieve the User's Mac Address by means of querying the ARP Table.
PreProxy/WalledGarden	Preproxy must be enabled to use the walled garden or landing page feature. Set preproxy to Off to disable these features.
PreProxy Port	The Port that the PreProxy will listen for Requests on.
PostProxy	PostProxy must be enabled to use the Ad Insertion feature of the WiDirect.
PostProxy Port	The Port that the PostProxy will listen for Requests on.
AllowOnAuthDown	Allow users to maintain Internet Connectivity in the event the AuthServer is unreachable.

Table 4-3: Firewall Configuration Items

4.4 *Walled Garden*

The WiDirect's ***Walled Garden*** allows administrators to host local content (e.g., community website) that can be integrated into the captive portal-landing page. For example, administrators might want their users to go to google.com without network authentication. In order to allow this, only ".google.com" needs to be added to the Walled Garden list. The Walled Garden list can be set to retrieve and synchronize the local Walled Garden List with the Master list on the Authentication Server.

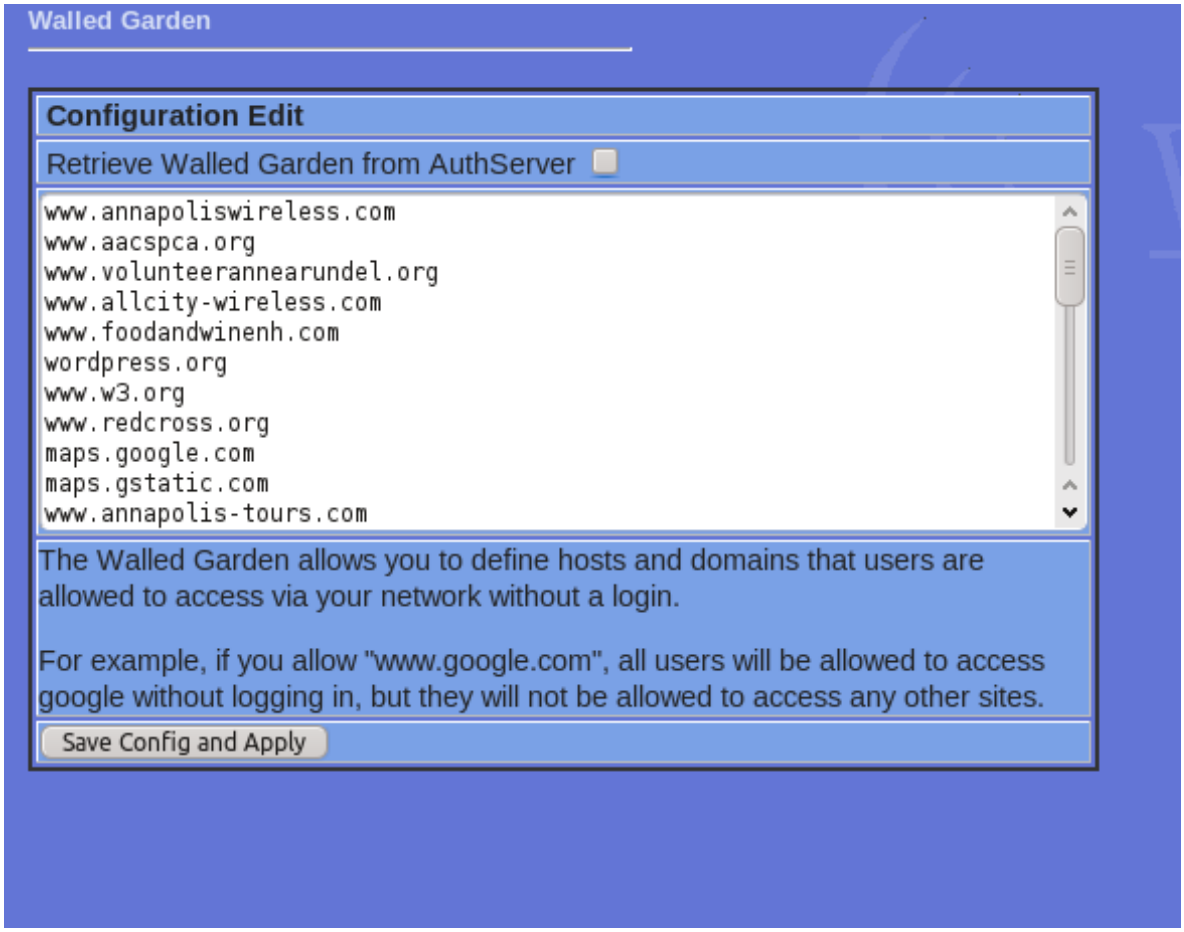

Walled Garden
Configuration Edit
Retrieve Walled Garden from AuthServer
www.annapoliswireless.com
www.aacspca.org
www.volunteerannearundel.org
www.allcity-wireless.com
www.foodandwinenh.com
wordpress.org
www.w3.org
www.redcross.org
maps.google.com
maps.gstatic.com
www.annapolis-tours.com
The Walled Garden allows you to define hosts and domains that users are allowed to access via your network without a login.
For example, if you allow "www.google.com", all users will be allowed to access google without logging in, but they will not be allowed to access any other sites.
Save Config and Apply

Figure 4-4: Walled Garden

4.5 *Preproxy*

When enabled in the firewall configuration file, the Preproxy service is responsible for redirecting users to either the login page or the landing page. It also allows users to visit sites on the walled garden without logging in. The configuration may be edited to change the number of processes that are running at any given time. Typically the default settings are fine, but in a large network, or if a lot of content is being displayed to users that are not signed on, it is then a good idea to increase the number of Preproxy processes.

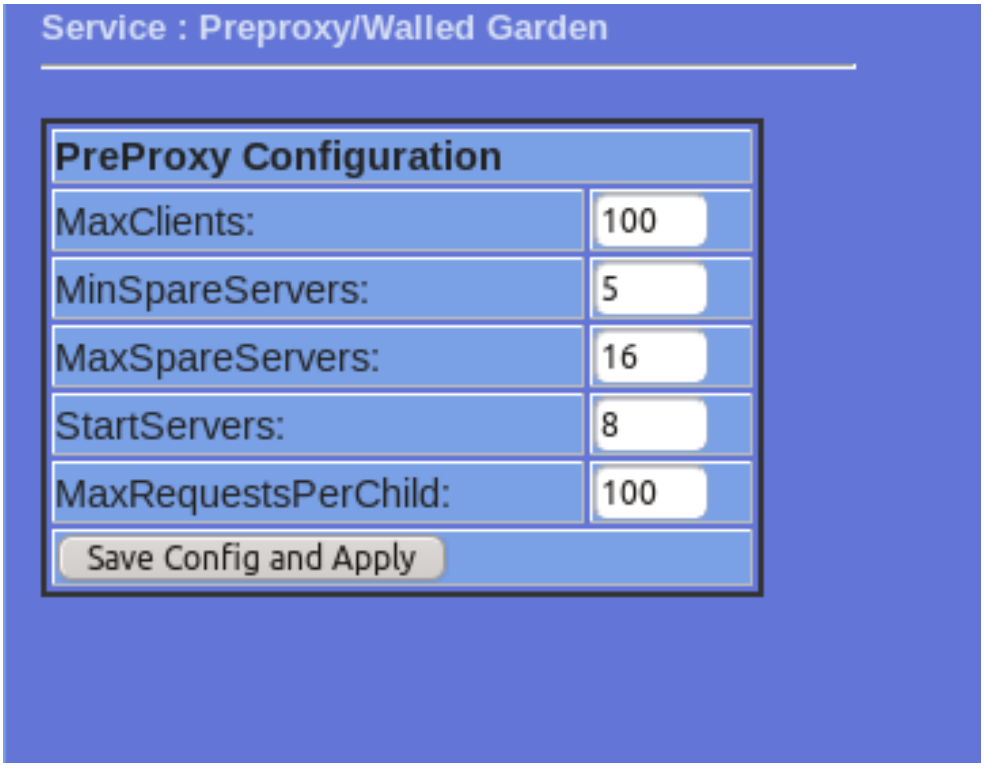


Figure 4-5: Preproxy Configuration

5 Tools

The **Tools** section provides the WiDirect administrator with the basic network troubleshooting tools of ping, trace route, and DNS query.

5.1 *Ping*

Ping allows an administrator to test network connectivity by sending a ping request to another machine on the network. Enter in the target IP address of the remote machine to test and click the **Ping** button. The results of the ping will be displayed.

This example is a successful ping of IP 192.168.20.248:

PING 192.168.20.248 (192.168.20.248) 56(84) bytes of data.
64 bytes from 192.168.20.248: icmp_seq=1 ttl=64 time=0.310 ms
64 bytes from 192.168.20.248: icmp_seq=2 ttl=64 time=0.264 ms
64 bytes from 192.168.20.248: icmp_seq=3 ttl=64 time=0.214 ms
--- 192.168.20.248 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2000ms
rtt min/avg/max/mdev = 0.214/0.262/0.310/0.043 ms

5.2 *Trace route*

Like the **Ping** command, the **Trace route** command tests network connectivity by attempting to find the network path between the WiDirect and another network device. Type in the target address and click the **Trace route** button. The results of the **Trace route** will be displayed after the WiDirect executes the command.

Example output:

traceroute to 10.3.1.50 (10.3.1.50), 30 hops max, 40 byte packets
1 balance (192.168.200.1) 1.875 ms 2.286 ms 2.747 ms
2 73.135.120.1 (73.135.120.1) 81.174 ms 93.181 ms 93.600 ms
3 ge-1-20-ur01.annapolis.md.bad.comcast.net (68.87.136.205) 94.065 ms 94.535 ms 94.514 ms
4 te-9-3-ur02.gambrills.md.bad.comcast.net (68.87.128.150) 94.983 ms 94.957 ms 96.891 ms
5 te-9-1-ur01.gambrills.md.bad.comcast.net (68.87.129.17) 94.858 ms 97.319 ms 97.295 ms
6 te-7-1-ar01.capitolhghts.md.bad.comcast.net (68.87.129.22) 97.265 ms 79.813 ms 80.194 ms
7 12.86.111.5 (12.86.111.5) 81.152 ms 117.899 ms 141.375 ms
8 tbr2.wswdc.ip.att.net (12.122.113.78) 162.803 ms 163.262 ms 163.726 ms
9 cr1.wswdc.ip.att.net (12.122.16.89) 164.194 ms 164.173 ms 164.619 ms
10 cr2.phlpa.ip.att.net (12.122.4.53) 165.089 ms 165.062 ms 165.504 ms
11 tbr2.phlpa.ip.att.net (12.122.20.86) 167.469 ms 167.444 ms 167.894 ms
12 tbr2.cgcil.ip.att.net (12.122.10.93) 166.859 ms 171.816 ms 172.279 ms
13 12.122.99.93 (12.122.99.93) 113.359 ms 105.891 ms 183.838 ms
14 12-215-4-17.client.mchsi.com (12.215.4.17) 321.209 ms 321.622 ms 321.111 ms
*15 12-215-8-163.client.mchsi.com (12.215.8.163) 328.543 ms * **
*16 10.3.1.50 (10.3.1.50) 338.253 ms 267.762 ms **

5.3 *DNS Query*

The ***DNS Query*** command allows an administrator to test DNS connectivity. DNS is very important because the captive portal uses it to detect a user's initial Internet request. DNS is also used in some services such as FTP.

For Domain resolution check, go to the ***Tools*** menu and then ***DNS Query***. Type in a domain to query, such as www.google.com and click the ***Lookup*** button. The results will be displayed once the lookup completes.

DNS look up of www.google.com
Server: 192.168.200.1
Address: 192.168.200.1#53

Non-authoritative answer:
www.google.com canonical name = www.l.google.com.
Name: www.l.google.com
Address: 64.233.161.99
Name: www.l.google.com
Address: 64.233.161.104
Name: www.l.google.com
Address: 64.233.161.103
Name: www.l.google.com
Address: 64.233.161.147

6 Command Line Interface

6.1 *Secure Shell access*

An SSH client is required in order to access the command line interface of the WiDirect. AllCity Wireless recommends using *putty*, which is a free download at this website:

http://www.chiark.greenend.org.uk/~sgtatham/putty/

By opening putty or another SSH client, connect to the IP address of the WiDirect machine. By default, this IP address is 10.4.1.1 on the SSID1 interface. However, if the IP address of any of the WiDirect's interfaces has changed, the new IP address should be the one that used in the SSH connection. If you are accessing from the Internet, you'll want to use the public IP address of the WiDirect.

Once connected, the system will ask for a login and password. Administrators must use the **root** login to gain access. If this is a new system, the password will be **widirect**.

Once connected, Administrators are free to use any of the standard Unix commands to navigate the system. To exit the command line interface, use the **logout** command or **CONTROL-D**.

NOTE: If editing files, consult the VI quick reference guide located in the WiDirect user manual located on the AllCity Wireless Support site.

7 Technical Support

Support Contact Details

Dedicated e-mail support:	support@allcitywireless.com
Self-support:	www.allcity-wireless.com/support
Corporate Address:	326 First Street Suite 23 Annapolis, MD 21403